C. Journals.

1. THE MATHEMATICS TEACHER, Syracuse, New York.
   Especially commended to those teachers who teach only elementary algebra and plane geometry, or who are not specialists in mathematics.
2. THE AMERICAN MATHEMATICAL MONTHLY, Chicago, Illinois.
   Especially commended to teachers of trigonometry and advanced algebra and to all teachers of mathematics in colleges.

The session adjourned with the election of Principal A. G. Grant of the Ferndale High School as Chairman of the Section for the ensuing year.

BOOK REVIEWS.

SEND ALL BOOKS FOR REVIEW TO PROFESSOR W. H. BUSSEY, University of Minnesota.

Problems in the Calculus, with Formulas and Suggestions. By DAVID D. LEIB. Ginn and Co., 1915. xi + 224 pages. $1.00.

This book is one of the mathematical texts for colleges edited by Professor Percy F. Smith, of the Sheffield Scientific School of Yale University. It is designed to be a graded collection of problems covering the entire field of the calculus as it is taught in American colleges. Every teacher of the calculus at times feels the need of a collection of supplementary problems which are not in the textbook which his class is using. This book by Mr. Leib is the outgrowth of lists of problems prepared by him from year to year to supplement the textbook used in Sheffield Scientific School. Preceding each set of problems is a brief introduction in which new laws and formulas to be used are stated without proof. There is also a discussion of the technique involved and of the errors most likely to be made by students. Here is a specimen introduction. It precedes *Exercise XLI, Indeterminate Forms, 0/0.* "If a fraction $f(x)/F(x)$, where numerator and denominator are both functions of x, assumes the indeterminate form 0/0 for a particular value of x, its limiting value may be found by differentiating $f(x)$ for a new numerator and $F(x)$ for a new denominator, giving $f'(x)/F'(x)$. If this form is still indeterminate, repeat the process. In the case of trigonometric functions it is frequently desirable or necessary to change the form of the functions before differentiating. Note that you do *not* differentiate the fraction. Evaluate each of the following for the value of x given. (Assure yourself first that the forms are indeterminate.)"

Answers to a large number of the problems have been omitted purposely. "The general plan is to give the answers to one or more examples of each type so that the student may attack further examples of a similar nature with increased confidence. Other answers have been omitted so that the book may be used in tests and in work where it is not desirable for the student to have the answers."

This practice of omitting many of the answers seems of doubtful value to the reviewer who believes in textbooks with answers to almost all problems. The student can teach himself so much more if the answers are given. No teacher has time to find all the errors of his students, and the student may be able to find

his own if he knows that he has made any. If no answers are given, the student works a problem and does not know whether it is right or wrong until he comes to class. There are problems, like problems in finding the integral roots of equations or problems in factoring in elementary algebra, which are of such a nature that the answers, if given, supply the student with too much information as to the method of working the problem. But there are not many such in the calculus. Furthermore, if the answers are not given, and if the same textbook is used for several years, the number of second-hand books in use gets to be considerable and these have many of the answers marked in by students. Then the students in the class are not all on the same footing with respect to answers. Some of them have the answers and some do not. This use of second-hand books, with many answers marked in, is likely to interfere with the use of this book of problems in tests as is suggested by the author in the quotation given above.

The book is much more pretentious than the "Problems in Differential Calculus" published by W. E. Byerly in 1895. A good bibliography of problem books in the calculus, mostly in German, is to be found in the *Bulletin of the American Mathematical Society*, June, 1914.

W. H. BUSSEY.

UNIVERSITY OF MINNESOTA.

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL AND R. P. BAKER.

[Send all Communications to B. F. FINKEL, Springfield, Mo.]

PROBLEMS FOR SOLUTION.

ALGEBRA.

452. Proposed by CLIFFORD N. MILLS, Brookings, S. Dak.

Find in the form of a continued fraction the positive root of the equation $x^3 - 2x - 5 = 0$.

453. Proposed by A. J. KEMPNER, University of Illinois.

Is the series whose terms are the reciprocals of all positive integers not containing the figure 0, convergent or divergent?

454. Proposed by C. N. SCHMALL, New York City.

Prove that a number is divisible by nine if, and only if, the sum of its digits is divisible by nine.

GEOMETRY.

483. Proposed by LAENAS G. WELD, Pullman, Illinois.

A circle is inscribed in a triangle. In each of the three spandrils exterior to the circle another circle is inscribed; in the remaining spandrils three other circles; and so on ad infinitum. Show that the sum of the areas of these circles is given by the formula:

$$\Sigma = \frac{\pi}{4}\frac{\Delta^2}{s^2}\left[\frac{1}{\sin(A/2)} + \frac{1}{\sin(B/2)} + \frac{1}{\sin(C/2)} - 2 + \sin\frac{A}{2} + \sin\frac{B}{2} + \sin\frac{C}{2}\right].$$

484. Proposed by NORMAN ANNING, Chilliwack, B. C.

Show that when spheres of uniform size are packed in the closest possible manner there is, in the interior of the mass, about 26 per cent. of voids.